

A Conference Panel Discussion

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The Role of Rules in Monetary Policy

I WILL TRY TO ASSUME my comparative advantage on this panel and put a broader-brush perspective on monetary aggregates, intermediate targets, rules versus discretion, and the recent history of monetary policy-making. Many of my positions have been stated in various parts of several of the recent *Economic Reports of the President*.

Above all, monetary policy ought to be forward-looking. It should be rule-like, or rules-based, but not necessarily mechanical as in a Friedman or Shaw fixed money growth rule. Let me state a few propositions that support my position and which a fair reading of history would conclude are sensible even though there are persons at this conference who have argued contrary propositions over time.

The first is that high inflation, indeed even high and stable inflation, can carry substantial cost to the economy. It was not uncommon in the late 1970s and early 1980s for people to argue that if we could more or less stabilize inflation so that the variance was much smaller than it had been, a high mean of 10 or 12 percent might be far preferable to bearing the potential cost of disinflation. The cost of disinflation was viewed as inordinately high, and indeed we did have a high cost, as Rick Mishkin stated, in the recessions of 1980 and 1981-82. But that cost, according to any serious analysis, was far less than the simple models that many economists were using predicted, especially in terms of lost

output. The costs were perhaps a third, and certainly less than half, in terms of lost real output than what had been predicted for the amount of disinflation engendered.

The cost of inflation stems from a variety of things but one of the most important is that the fiscal rules that determine our tax system are not invariant to the rate of inflation. While we eventually in the early '80s indexed tax brackets for inflation, we did not index the definition of income. We still have historic cost depreciation. We still have nominal capital gains tax, tax nominal interest, and allow deductions for nominal interest. It is complex, but when you are looking at investment decisions, those are important. This is part of the reason why monetary policy in the late 1970s, likely the worst episode in the post-World War II history of monetary policy, was so bad. Attention was being paid to nominal interest rates rather than, as difficult as they are to measure, expected long-run real *net-of-tax* interest rates.

The second point I would make, and will come back to, is that those who argue that indeed money does matter initially—and not just for prices but for real output—seem to have been correct. A tighter monetary policy than the Fed envisioned in the early '80s led to that costly (but not as costly as predicted) disinflation. I think that the simple monetarist propositions available at that time broke down with the collapse of M1 velocity in the early 1980s (and

again with the collapse of M2 velocity in the early 1990s).

The simplistic notions of monetarists took a beating, even if the fundamental tenets were, and I think continue to be, more or less correct. Keynesian and neo-Keynesian arguments took a beating as well since writers in the econometric Keynesian tradition greatly overstated what the cost of the disinflation would be in terms of lost output. Those who focused on expectations and on credibility proved to be—and let me make sure I am careful about this—*partially* correct, in my opinion. I think they were no more fully correct than the monetarists were or than the simple Keynesians and neo-Keynesians were. All of these schools of thought contained elements of truth, but none was a sufficient descriptor of the economy or prescriber of economic policy. We have learned through the work of some people at this conference and others that some households and businesses indeed are liquidity-constrained and do respond to short-run cash flows. Hence, there is some scope for affecting the shorter term course of the economy, if and when that proves to be desirable, with discretionary policy.

Expectations certainly have been shown to matter. A large part of the reason that the last decade has been substantially better than the previous decade, in terms of macroeconomic performance and in a manner I will describe in a moment, stems from the fact the Fed has gradually built considerable credibility on reducing inflation and keeping inflation low and stable. The inflation expectations premium has been gradually abating.

The next point I would make is that the economics profession ought to be quite humble about both our ability to go from changes in monetary policy to short-run changes in nominal GDP, and from the change in nominal GDP to the changes in inflation and real output. Humility is called for in far greater magnitude than has been evidenced by most economists; that will lead me back in a moment to the proposition that I will make about nominal GDP rules.

The weight of the evidence accumulated during the recent relatively successful disinflation—first in the early '80s and later in the last few years, from double digits down to the 4 to 5 percent range and, later, from that range down to around 3 percent—suggests that after adjust-

ing for the state of the economy the disinflation was achieved in the context of much lower unemployment and much less lost output than had been expected. Some people claim that the 1970s was just as good a decade and that despite the long expansion in the 1980s, the growth then was no higher. But the 1980s were a period when lots of inflation was taken out of the system and the previous decade was a situation in which lots of inflation was added to the system. Indeed, if you step back (and I know it is hard when you are doing technical research on a specific subject) and look at post-World War II history, we were in this horrible situation where at corresponding stages of each cycle—the midpoint, trough or peak—inflation at that point was getting higher and higher. And perhaps the most remarkable thing is that not only was inflation stabilized but that relationship was broken, hopefully for a considerable length of time, for the foreseeable future. There were many people who, circa 1980, thought we would have, as I mentioned, not only something close to a depression to get inflation down to low levels, but that inflation would then start to accelerate substantially once we got well into the next expansion.

Can we do better? My answer is yes. And I will get to that in a second. As I said earlier, the worst episode was the late 1970s and I believe that there were several fundamental mistakes. One was accommodation and, without getting into personalities, I'll just say that it seemed to me we had a Fed in the late 1970s that was really not responsible. Whatever modest impetus and modest cost-push supply-shock we had, whatever oil prices did, was a tiny fraction of the total impact on the acceleration of inflation. Some people attribute up to 3 percentage points in the 13 percent rate to the oil shock. But the inflation was basically a monetary phenomenon.

The Volcker disinflation of the late 1970s and early 1980s, if I can revert to a professor giving grades, gets a B+ or A-. It was achieved at much less cost than anticipated despite the severe recession, but also I think Rick Mishkin is right that the Fed really wasn't looking just at money as velocity was collapsing. I do believe that monetary policy, ex post, proved to be much tighter than the Fed had imagined and they did want a more gradual disinflation (that is one reason they don't get an A). Whether a more gradual disinflation could have been

achieved at a lower cost is something we will never know. I give the Fed an A- for its policy in the late 1980s to try and proactively head off an incipient, building inflation. And this gets back to a point several people have made that monetary policy has to be forward-looking.

The Fed rarely gets credit when it prevents the inflation rate from going from, say, 4.5 percent to 6.5 percent, because people never see it get up to 6.5 percent and then go back down again. And so I think an A- because they probably went a little too far. While they couldn't have foreseen the oil shock or anticipate the size of the defense drawdowns and other things going on in the economy, they probably should have done better at understanding that the regulatory system of financial institutions was going to take some steam out of the economy. Whether that was desirable is another story, but I think that you can't understand monetary policy without also looking at the regulatory structure of the financial system. I would give the Fed lower marks for easing too slowly and too timidly but, to be intellectually honest, had they eased as I thought desirable—a bit more rapidly and a bit more aggressively—how much of that would have shown up in output and how much of that in slower reduction in inflation is certainly an open question.

I certainly give them much higher marks than most of the academic economics profession—Samuelson, Tobin, Solow, Feldstein, Friedman, McCracken and others. Yet, by the end of '91 or early '92, they got to about where they should be, and I think the Fed is pretty close to where it ought to be, although it probably will need to move to a less accommodative policy as 1994 progresses.

What have they been doing? At various times, the Fed has announced or listed in prime directives that they have been looking at interest rates, reserves, M1 and M2, commodity prices, exchange rates, and so on. I think it is very clear that on the Federal Open Market Committee (FOMC) people are looking at different things but that, in general, the primary concern is and has been reducing inflation. They have been somewhat opportunistic about doing that. They get concerned when it appears that inflation looks like it may accelerate or over bad news in contemporaneous data about inflation. It is an interesting issue how much information that it is conveying and its potential as a leading

indicator of future inflation. They have tended to take advantage of opportunities to try to take another round out of inflation when that seems desirable. When the economy happens to be slack, they tend to try to help the economy somewhat in the short run. While there was not a lot of discussion in the last year or two about price stability, there was a lot of discussion of that as the primary goal a few years ago—they view their job as to try to keep inflation low and steady and try to avoid doing anything that leads to an unnecessarily large swing in output. I echo the lender-of-last-resort, avoid-a-financial-panic issue. They have operated under some big structural changes in the economy, including the declining fraction of credit extended by the banking system, the fact that far less of broad monetary aggregates is reserved against any more, changes in the international arena which leads to far more mobility of capital, and so on.

What I infer from all of this is that the Fed has to be a compass, not a weather vane, laying out a basic path that they are trying to achieve for their policy. I think they have done that, although at times less than clearly. In general, they have laid out a course of what they are trying to achieve that has generally been fairly reasonable, with a couple of exceptions in the last decade or so. It is a rules-based policy, not one that is a fixed rule, but one that basically lays out a policy path that is deviated from only rarely and temporarily, for contingencies that are generally well-understood by the public to be rare events. The basic rules-based framework is the proper one for monetary policy, and I think it is probably the way to understand what the Greenspan Fed has been trying to do, and perhaps the Volcker Fed up to a point as well.

A far more difficult question is what do you do about specific indicators. I personally do not believe that M2 is a sufficient intermediate indicator. I don't believe nominal GDP is either, since we still have the problem of separating out real growth and inflation. I believe the list of indicators must include more than one simple measure such as M2, or adjusted reserves, or M1. That is not necessarily a disingenuous intellectual exercise to throw the Congress off their backs, although that may be a valuable purpose. I think that there is information contained in a variety of indicators and the Fed is going to have to look at all of them.

Secondly, I believe that it is desirable for the Fed to lay out parameters, broadly speaking, despite Rick Mishkin's argument that the Bundesbank and the Swiss have often been way off in money growth targets. The Fed will continually face episodes such as we had in the early '80s and the early '90s when relationships between reserves and rates, between one or another monetary aggregate and nominal GDP, and among nominal GDP, real GDP and inflation, will be far less stable than they are at other times. Nevertheless, I do believe it is desirable for the Fed, in the context of the

rules-based policy, to lay out what it is trying to achieve and how it is trying to achieve it in a world of incomplete information, rapid structural change and inaccurate data. That is not a simple task, but one the Fed has performed, by any fair evaluation, quite well for the past decade-and-a-half.

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What Is the Fed's Decision Problem?

WHAT IS THE BEST model of a piece of iron? If it is to be thrown, the best model might be a uniform mass of fixed density and shape. If it is to conduct electricity, thinking of the piece of iron as a hollow tube like a pipe that carries water, is illuminating. For purposes of studying its magnetic properties, it may be best to consider the piece of iron as a collection of rigidly located magnetic dipoles that can be aligned or not. In general, the best model depends on the use to which the model is put.

In an economic setting, the best economic model is one that helps us understand the choices made by economic agents. Unfortunately, the specific nature of the Fed's decision problem remains obscure in most discussions of Federal Reserve policy. In these remarks, I look at the Federal Reserve through the lens of decision theory. While I'm not necessarily suggesting that the Fed must or should specify an explicit objective function, I do think that decision theory is nonetheless a very useful framework for thinking about the economy, monetary aggregates and the Fed's policy role. This should be a comfortable notion for economists, virtually all of whose models are based on decision theory.

The Objective Function

Many purely political attacks on the Fed are posed in terms of the objective function. Nonetheless, its specification is a substantive issue. Focusing on the Fed's role in monetary policy, there seems to be some consensus within the

Fed that there is a lexicographic preference to keep inflation down, and given low inflation, to stimulate economic growth. Separate criteria are applied to crisis management such as the injection of cash to help illiquid specialists during a crash. None of this is entirely satisfactory: Lexicographic preference for reducing inflation is certainly not the ultimate objective of the Fed, which might ultimately seek a good outcome for the economy given the complex interaction between the Fed, the Congress, the rest of government, and the rest of the economy.

In order to achieve a good outcome, part of the Fed's objective should be political survival with powers (including independence) intact. It seems that the lexicographic objective to keep inflation down is intended to do some good in the economy subject to political survival and given inherent limitations on what the government can do to help the economy. This narrow view of the Fed does not seem ideal, but is surely better than what would come under the political control that would result from any loss of the Fed's independence.

Control Variables

Although control variables include such things as reserve requirements and discount window policy, the most commonly used control variable is the open market operation. I continue to be puzzled as to why the Fed confines its open market operations to trading only once each day in a very limited set of securities, most

often repurchase agreements in short-term Treasuries. At the same time, the Fed seems to be very interested in the behavior of long rates, apparently believing that movements in long rates signal changes in expectations of inflation. In other words, the Fed is trading short-term instruments while judging the success or failure of its actions, relative to maximizing its objective function, by watching long-term rates. This choice of control variable, given the objective function, seems puzzling. Since the Fed is not the only economic actor in the economy that looks to long rates to think about inflation, perhaps a better way to influence expectations of inflation is by trading long-term bonds themselves. Why doesn't the Fed trade long-term bonds? One reason often cited is, in truth, irrelevant: Operation Twist in the '60s was a bad idea imposed on the Fed from outside and it didn't work. A more serious suggestion is that the Fed may not be big enough to affect long rates or, in other words, that long-term bonds may not in fact be a feasible control variable.

The reasons why it may be infeasible for the Fed to trade enough to move long rates, however, aren't self-evident and usually are left unstated. In addition to long-term bonds, there are numerous other financial instruments such as futures and options on Treasuries that might be used as control variables. One reason for considering these instruments as control variables arises from the recent finance literature on how price pressure—the amount prices move in response to trading volume—varies across markets. Price pressure is a lot like walking down the demand curve as a monopolist: When your early trades have a big effect on price, you get a much less favorable price on subsequent trades. Most agents who take a position with respect to market interest rates want to minimize price pressure. The Fed actually may prefer the *opposite* perspective. If the Fed's motive for trading is an attempt to change expectations (say, of future inflation) without taking on too large a risky position, the Fed may want to *maximize* (not minimize) price pressure for a given level of exposure. Trading long-term instruments may be a feasible way to do so.

Constraints

What are the constraints faced by the Fed in maximizing its objective function? Almost every discussion of Fed policymaking hinges on some implicit constraint. If the Fed is, in fact, too

small to move long rates, for example, then there must be some limitation to the Fed's ability to short T-bills and go long Treasury bonds or vice versa; otherwise, it seems that they surely could take positions that would move long-term rates. It should be interesting to specify explicitly such restrictions. Other constraints may arise from the Fed's charter. Does the Federal Reserve Act constrain the amount of risk the Fed is permitted to absorb? It might seem not. After all, what is interest rate risk to an agent who can always print money to satisfy a claim?

Several central banks have learned the hard way the limitations on their ability to influence foreign exchange markets. The possibility of large losses (or even profits) seems less likely in domestic markets, given the printing of money and possible deferral of paper losses. Nonetheless, given the 1993 magnitude of \$16 billion returned to the Treasury by the Fed, it seems that trading gains or losses of \$5 billion could cause severe political damage. If the Fed misjudges its capacity to bear risk, it can cause significant damage by being either too bold or too timid.

The Information Set

We have discussed the objective function, the controls, and the constraints. We cannot understand a decision problem without knowing the decision maker's information set. In finance, we routinely gather a great deal of information by monitoring more or less continuously the market prices of securities. Macroeconomists similarly often monitor high-frequency data such as market interest rates as indicators of expected inflation and the level of the stock market for expectations of economic activity. There are, however, many other variables that should be considered. Option prices, such as Standard & Poor's 100 index options and T-bond futures options, may be used to infer the types and amount of risk people perceive in the market. These data permit us to separate the degree of investors' *uncertainty* about the level of future inflation from investors' expectations of the *level* of inflation. This is important because it is the degree of uncertainty about inflation, not the level itself, that makes planning difficult for businesses using nominal contracts. Similarly, the stock index options measure investors' uncertainty about the overall level of future economic activity.

Other data, such as information on the money stock or unemployment, are available at an

intermediate frequency. These intermediate frequency data provide some independent information beyond what is available in security prices, although how much is really an empirical question. And then there are the low-frequency time series, which are very important, such as inflation or industrial productivity.

This plethora of variables raises the difficult question: When we can't look at 16 things at once, how do we summarize the information in a way that is useful for policymaking? This is the type of question that is implicit in the choice of a monetary aggregate or any other policy indicator or target. In principle, we should not throw anything away. However, if we put too many variables in our statistical analysis, the loss of power will reduce the quality of fit, especially when some ultimate objectives such as production and inflation are

available only at low frequencies. Although it seems sensible to focus on a subset of the available data, it is unclear what should be the criterion for combining data or for deciding which data to throw away and which data to retain.

This brief look at the Fed's decision problem suggests several interesting avenues for research. It would be useful to have a careful and apolitical analysis of the Fed's objectives. We should quantify the Fed's constraints on trading, base money creation, and risk-bearing. Empirically, we should have more work with high-frequency data (daily and intra-day) and more examination of the Fed's actual controls (trades) and their direct impact on markets. It would be interesting to understand better how to aggregate low- and high-frequency data. Keeping the Fed's decision problem in mind will help to guide our research toward the most important policy issues.

Bennett T. McCallum

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Monetary Policy Without Monetary Aggregates

THE PAPERS PRESENTED at the conference represent a useful step in the ongoing search for improved ways of measuring monetary aggregates. Their basic idea, of weighting components of the aggregates by a measure of the extent to which they serve as media of exchange, should be rather appealing to anyone who views the medium-of-exchange function as the defining characteristic of money. And I don't know of any other potential defining characteristic (for example, the store-of-value function) that makes any sense. So, to repeat, I find quite promising the idea that some indices and weighted sums might do a better job than the simple-sum aggregates in measuring the quality of money.

But while this type of study seems potentially useful for the purpose of studying money demand behavior, building econometric models and judging the historical record, I am not enthusiastic about the development from the perspective of monetary targeting. The reason—as some of you will have heard me argue before—is that I believe that there is a good way of conducting monetary policy that does not rely on any targeted monetary aggregate. Instead, it uses as its target variable nominal GDP, or GNP, or domestic demand, or some such measure of aggregate nominal spending.

There are several ways of arguing that nominal GDP (or whatever) is a more appropriate target variable than any monetary aggregate. The simplest and most blatant is to just assert that it is obvious that a central bank's main job

is to keep total nominal spending growing smoothly at a noninflationary rate. But one can proceed more circumspectly by arguing instead that from the perspective of hitting price level or inflation targets, on average over the next decade or so, we know with much greater accuracy what growth rate of nominal GDP will do the job than we do for M1 or M2. And even if the task of developing an improved index of money is successful, it will still be true that we will know with more accuracy what rate of growth is needed (to deliver a chosen inflation rate) for nominal GDP.

To the foregoing one might naturally respond, why not make inflation the target directly rather than indirectly? But to this there are two answers. One is that, because the price level usually responds more slowly to policy actions than does nominal GDP, a policy feedback rule is more likely to generate dynamic instability—so-called instrument instability—if it responds to target misses for the price level rather than nominal GDP. And the second argument is that generating a smoothed path for nominal GDP is likely to result in smaller fluctuations of real GDP—that is, reduced cyclical variability. (I am, of course, aware that we cannot be certain about the latter, given current knowledge, and also that it is not desirable to smooth out responses to all types of shocks. But I will stand by the statement nevertheless.)

To return to the issue concerning monetary aggregates, the only advantage that I can see

for them (as targets), relative to nominal GDP, is that observations are available more often and more promptly. But we could certainly devise other measures of nominal aggregate spending that would be available more frequently and promptly. Furthermore, it is not clear that having measurements more frequently is terribly important. Over the last year or so, we have experienced quarter after quarter of rapid M1 and base growth at the same time as very slow M2 growth. These aggregates were suggesting either excessively loose or excessively tight monetary policy, depending on which one you utilized. But nominal GDP growth chugged along reasonably close to 5 percent (per annum) in almost every quarter, which is just about enough for 3 percent real growth and 2 percent inflation. So if 2 percent is the Fed's concept of "zero inflation," which seems defensible, then policy behavior has been just about right from a medium-term perspective. And the point, relative to the issue regarding the frequency and promptness of measurements, is that these various growth rates have differed in the manner described above for many months in succession.

One objection that is sometimes raised against nominal GDP targets is that they might make it appear to the public that the Fed is controlling real GDP—that it is attempting a role that is greater than is actually feasible. But I would not presume that these targets would be publicly announced. The role for targets that I have in mind is as significant inputs that the FOMC would use in making its decisions, as proposed by Taylor (1993). Announcements are much less important, I believe, than behavior.

Having appropriate targets is, of course, not the whole story; to conduct monetary policy successfully it is also necessary to have a policy feedback process—among friends I would call it a "rule"—that specifies instrument settings, that is, settings of a variable that the central bank can control directly or with great accuracy. In my own studies,¹ which have been designed to see if a simple rule would succeed in hitting nominal GNP targets with reasonable accuracy in a variety of (small) econometric models, I have usually used the St. Louis adjusted monetary base as the instrument variable. The reason for that choice is that the base's growth rate provides a nice measure of the pace at

which open market purchases (or sales) are being conducted, and if the adjusted base is used the measure takes account of changes in reserve requirements as well. So it seems to be the most natural aggregate among those that are highly controllable—which the base is since it appears on the Fed's own balance sheet and so could be monitored daily (and thereby kept close to the specified values).

The other main contender for the role of the instrument variable is, of course, the federal funds rate (or some other short-term interest rate). But interest rates seem quite unattractive because a high interest rate suggests tight money from a short-term perspective but easy money from a long-term perspective. Or, as I say to my students, if a central bank wants interest rates to be lower, then it needs to raise interest rates. That strikes me as an extremely undesirable feature for an instrument variable. In addition, I have tried in my simulation work to design interest rate rules and have found that they perform much more poorly than ones with the base instrument.² These results, at the quarterly frequency, are not definitive but they are supportive of the belief that the base is the better instrument from a macroeconomic perspective.

Most actual central banks are, of course, extremely resistant to proposals for accurate base control, on a short-term basis, and have accordingly been rather unreceptive to such policy rule suggestions. One important reason for that resistance, I believe, is the belief that exerting short-term base control would generate more financial market instability and would also require the central bank to give up its role as the lender of last resort. But I would like now to argue against that belief.

There is a fairly well-known paper by Goodfriend and King (1988) that emphasizes that functioning as the lender of last resort does not necessarily require the provision of discount window loans; what is necessary is that the central bank makes available additional base money at times of financial crisis. And they argue that this response would come about automatically if interest rate smoothing were being practiced. Some critics have described the Goodfriend-King scheme as calling for a constant rate of base money growth during times of financial crisis,

¹These include McCallum (1988, 1990, 1993a).

²See McCallum (1990, pp. 61-6; and 1993a, Section VII).

but that is an entirely incorrect description of what their argument or proposal actually is.

Consequently, in a paper that I have very recently written for a Bank of Japan conference (McCallum, 1993b), I have tried to follow up on the Goodfriend-King idea by exploring the possibility of using a nominal GNP targeting rule to generate implied quarterly settings of the monetary base, and then to combine that with a higher-frequency rule that calls for weekly adjustments of a federal funds rate instrument that are designed to achieve the specified quarterly base values. This weekly rule can be made to imply a lot of week-to-week smoothing of the funds rate and thereby automatically to provide lender-of-last-resort support to the financial system. But can it do that while simultaneously hitting the quarterly base settings with reasonable accuracy? That is clearly an empirical question whose answer depends upon the size of shocks that occur and the strength of weekly responses of the base to funds rate adjustments. But I have begun to study that question in this new paper, and the results obtained are quite encouraging.

I would like to conclude by expressing my appreciation to the St. Louis Fed's Research Department for continuing their long-running program of searching for ways to improve the conduct of monetary policy.

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